

# A Runtime Verification System for Developing, Analyzing and Controlling Complex Safety-Critical Software, Phase I

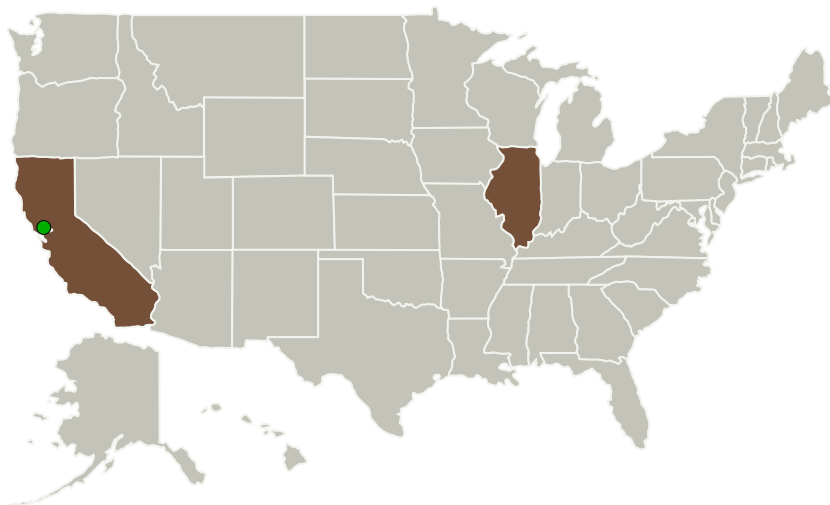
Completed Technology Project (2010 - 2010)



## Project Introduction

A comprehensive commercial-grade system for the development of safe parallel and serial programs is developed. The system has the ability to perform efficient parametric runtime verification of programs. This can be used to ensure the safety of mission critical systems at runtime. The system also has the ability to extrapolate all feasible program traces deriving from thread inter-leavings that meet the casual dependencies of a program from a single running. These feasible traces can be checked, using the same parametric trace slicing algorithm used for runtime verification, against safety properties. An extensive evaluation of the system on software critical to NASA is also performed, with the aid of Klaus Havelund.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Runtime Verification Inc	Lead Organization	Industry	Champaign, Illinois
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California



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## Primary U.S. Work Locations

California

Illinois

## Project Transitions



**January 2010:** Project Start



**July 2010:** Closed out

### Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138758>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

Runtime Verification Inc

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

Carlos Torrez

### Principal Investigator:

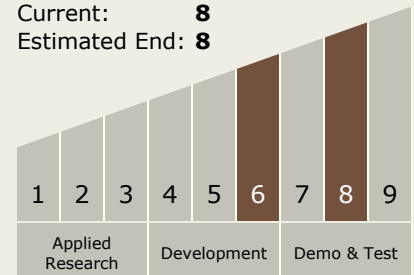
Patrick Meredith

## Technology Maturity (TRL)

Start: 6

Current: 8

Estimated End: 8



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## Technology Areas

### Primary:

- TX10 Autonomous Systems
  - └ TX10.2 Reasoning and Acting
    - └ TX10.2.5 Fault Diagnosis and Prognosis

## Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System